

CLAIMS

- 1
2 1. A printing process for forming high contrast color
3 images on polymer surfaces, comprising:
4 (a) forming a layer of substantially opaque liquid
5 toner comprising polymer based toner particles and a carrier
6 liquid, on an imaging surface;
7 (b) transferring the layer to an intermediate transfer
8 member;
9 (c) heating the layer on the intermediate transfer
10 member to a temperature at which the toner particles at
11 least partially coalesce;
12 (d) repeating (a) to (c) sequentially for at least one
13 subsequent layer in at least one color, said at least one
14 subsequent layer being transferred to the intermediate
15 transfer member onto the opaque layer to form multiple
16 layers on the intermediate transfer member; and
17 (e) transferring the multiple layers to a polymer
18 surface.
19
20 2. A process according to claim 1 wherein the opaque layer
21 is the lowest layer of the multiple layers on the
22 intermediate transfer member.
23
24 3. A printing process for forming high contrast color
25 images on polymer surfaces, comprising:
26 (a) forming a colored layer of liquid toner comprising
27 polymer based toner particles and a carrier liquid, on an
28 imaging surface;
29 (b) transferring the layer to an intermediate transfer
30 member;
31 (c) heating the layer on the intermediate transfer
32 member to a temperature at which the toner particles at
33 least partially coalesce;
34 (d) repeating (a) to (c) sequentially for at least a
35 substantially opaque liquid toner layer, said substantially
36 opaque layer being transferred to the intermediate transfer

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1 member onto the colored layer to a plurality of layers on
2 the intermediate transfer member; and

3 (e) transferring the plurality of layers to a polymer
4 surface.

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6 4. A printing process according to claim 3 and including
7 repeating (a) to (c) sequentially prior to (d) for at
8 least one subsequent layer in at least one different color,
9 said colored and opaque layers forming multiple layers on
10 the intermediate transfer member.

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12 5. A process according to claim 3 or claim 4 wherein the
13 opaque layer is the uppermost layer of the multiple layers
14 on the intermediate transfer member prior to transfer to the
15 polymer surface.

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17 6. A process according to any of the preceding claims
18 wherein the colored layers are in the form of an image.

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20 7. A process according to any of the preceding claims
21 wherein the opaque liquid toner contains a white pigment.

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23 8. A process according to claim 7 wherein the white
24 pigment is TiO_2 .

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26 9. A process according to any of the preceding claims
27 wherein forming a layer comprises:

28 (i) charging a chargeable imaging surface;

29 (ii) selectively discharging portions of the charged
30 imaging surface to form a predefined electrostatic image;

31 and

32 (iii) developing a layer of charged opaque white toner
33 particles onto the selectively discharged portions of the
34 imaging surface thereby providing a developed image
35 corresponding to the latent image.

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1 10. A process according to any of the preceding claims
2 wherein the polymer surface is the surface of a transparent
3 film.

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5 11. A process according to any of the preceding claims
6 wherein the polymer surface is coated.

7

8 12. A process according to claim 11 wherein the coating is
9 an ionomer.

10

11 13. A process according to claim 12 wherein the ionomer has
12 a low molecular weight.

13

14 14. A process according to claim 12 wherein the ionomer has
15 a high molecular weight.

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17 15. A process according to claim 11 wherein the coating is
18 an ethylene vinyl acetate polymer.

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20 16. A process according to any of the preceding claims
21 wherein the polymer surface is polypropylene.

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23 17. A process according to any of claims 1-15 wherein the
24 polymer surface is polyethylene.

25

26 18. A process according to any of the preceding claims
27 wherein the transfer of the multiple layers to the polymer
28 surface is effected with heat and pressure.

29

30 19. A process according to any of the preceding claims
31 wherein at least one of the at least one color layers is a
32 color halftone separation.

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34 20. A process according to any of the preceding claims in
35 which the toner particle layers form films on the
36 intermediate transfer member.

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2 21. A printing process comprising:

3 (a) forming a liquid toner image comprising toner
4 particles based on a first polymer and a carrier liquid, on
5 an imaging surface;6 (b) transferring the image to a surface coated with a
7 second polymer; and8 (c) fusing and fixing the image to the surface coating,
9 wherein10 the second polymer is either an ionomer or an ethylene
11 vinyl acetate polymer.

12

13 22. A process according to claim 21 wherein the first
14 polymer is an ionomer.

15

16 23. A process according to claim 22 wherein the first
17 polymer is a high molecular weight ionomer.

18

19 24. A process according to claim 22 wherein the first
20 polymer is a low molecular weight ionomer.

21

22 25. A process according to claim 21 wherein the first
23 polymer is ethylene vinyl acetate.

24

25 26. A process according to claim 21 wherein the polymer is
26 a ethylene copolymer.

27

28 27. A process according to claim 21 wherein the polymer is
29 a ethylene terpolymer.

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31 28. A process according to any of claims 21-27, wherein
32 the second polymer is an ionomer.

33

34 29. A process according to claim 28, wherein the second
35 polymer is a high molecular weight ionomer.

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1 30. A process according to claim 28, wherein the second
2 polymer is a low molecular weight ionomer.

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4 31. A process according to claim 28 wherein the second
5 polymer is ethylene vinyl acetate.

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7 32. A process according to any of claims 21-31, wherein the
8 substrate surface is a polypropylene film.

9

10 33. A process according to any of claims 21-31, wherein the
11 substrate surface is a polyethylene film.

12

13 34. A printing process comprising:

14 (a) forming a liquid toner image comprising toner
15 particles based on a first polymer and a carrier liquid, on
16 an imaging surface;

17 (b) transferring the image to a surface coated with a
18 second polymer; and

19 (c) fusing and fixing the image to the surface coating,
20 wherein the first polymer and the second polymer are both
21 ionomers.

22

23 35. A process according to claim 34 wherein the first
24 ionomer is of a low molecular weight.

25

26 36. A process according to claim 34 wherein the first
27 ionomer is of a high molecular weight.

28

29 37. A process according to any of claims 34-36, wherein the
30 second ionomer is of a low molecular weight.

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32 38. A process according to any of claims 34-36 wherein the
33 second ionomer is of a high molecular weight.

34

35 39. A process according to any of claims 34-38 wherein the
36 surface is a polypropylene film.

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2 40. A process according to any of claims 34-38 wherein the
3 surface is a polyethylene film.

4

5 41. A process according to any of the preceding claims
6 wherein the imaging surface is the surface of a
7 photoreceptor.

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9 42. A toner particle comprising:

10 a polymer; and

11 flakes of metal.

12

13 43. A toner particles according to claim 42 wherein the
14 flakes of metal have a dimension greater than about 4
15 micrometers.

16

17 44. A toner particle according to claim 43 wherein the
18 flakes of metal have a dimension greater than 6 micrometers.

19

20 45. A toner particle according to any of claims 42-44
21 wherein the metal flakes comprise gold.

22

23 46. A toner particle according to any of claims 42-44
24 wherein the metal flakes comprise silver.

25

26 47. A toner particle comprising:

27 a polymer; and

28 a fluorescent material.

29

30 48. A toner particles according to claim 47 wherein
31 fluorescent material is in the form of particles having a
32 size greater than 2 micrometers.

33

34 49. A toner particle according to any of claims 42-48
35 wherein the polymer is a low molecular weight ionomer.

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1 50. An electrified toner particle according to any of
2 claims 42-49.

3

4 51. A liquid toner comprising:

5 a plurality of toner particles according to any of
6 claims 42-50; and

7 a carrier liquid.

8

9 51. A printed image printed with toner particles according
10 to any of claims 42-50.

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12 52. A printed image printed with a process utilizing a
13 liquid toner according to claim 51.

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